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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,627	04/09/2004	Carlos Angulo Barrios	1153.087US1	8932
21186	7590	12/14/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH 1600 TCF TOWER 121 SOUTH EIGHT STREET MINNEAPOLIS, MN 55402			PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/821,627	Applicant(s) BARRIOS ET AL.	
	Examiner Sung H. Pak	Art Unit 2874	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Amendment***

Applicants' amendment filed 9/22/05 has been entered. All pending claims have been carefully reconsidered in view of the amendment and the accompanying argument of patentability. The previous ground of rejection is hereby withdrawn in view of the amendment and the argument. Upon further consideration, however the claims are rejected over a new ground of rejection based on a newly cited prior art.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 7-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onischenko (WO 02/079863 A2) in view of McCaughan et al (US 6,545,791 B1).

Onischenko discloses an optical device comprising: a silicon substrate (Fig. 1, page 5, line 19); an insulator formed on the silicon substrate (page 5 line 19); a planar micro-cavity formed on the insulator (Fabry-Perot cavity: page 6 lines 23-25); a first Bragg reflector formed on a first side of the micro-cavity (Fig. 3); a second Bragg reflector formed on a second side of the micro-cavity (Fig. 3); a rib extending through the cavity and Bragg reflectors (Fig. 8-9); a PIN diode formed on the micro-cavity that modulates a refractive index of the cavity (page 10 lines 19-24);

wherein the distributed Bragg reflectors comprise alternating area having high and low refractive indices, wherein the high refractive index sections are formed of Si (silicon), and the low refractive index sections are formed of SiO<sub>2</sub> (silica) (page 5 lines 19-24);

wherein the device further comprising insulative layer formed on the substrate between the substrate and the micro-cavity and Bragg reflectors (83- Fig. 8).

Nevertheless, Onischenko does not explicitly teach the use of electrically isolating lateral trenches on lateral sides of the micro-cavity as claimed. On the other hand, the use of a electrically isolating lateral trenches (i.e. air trenches) is known in the art, for example, as taught by McCaughan et al. (Figs. 2, 4). McCaughan et al. teach that such trenches are advantageous and desirable because it increases the efficiency of the optoelectronic device (column 17 lines 48-58). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Onischenko to have lateral trenches as taught by McCaughan.

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Claims 6, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onischenko (WO 02/079863 A2) in view of McCaughan et al (US 6,545,791 B1) as applied to claims above, and further in view of Comfort et al (US 5,308,785).

Onischenko, in view of McCaughan, renders the claimed invention of the present application obvious as discussed above. However, neither Onischenko nor McCaughan explicitly teach the micro-cavity being passivated by thermal oxidation of silicon and the trench being filled with dielectric material such as silicon dioxide.

On the other hand, forming passivation layers by thermal oxidation of silicon and filling the isolation trench with silicon dioxide is known in the art, for example, as taught by Comfort et al. (abstract). Comfort teaches that this feature is advantageous and desirable because it increases the efficiency of the semiconductor device (column 1 lines 17- column 2 line 60). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the device of Onischenko in view of McCaughan and Comfort to have passivation layer via thermal oxidation of silicon and trenches filled with silicon dioxide as claimed in the instant application.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak  
Primary Patent Examiner  
Art Unit 2874